

CLAIMS

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What Is Claimed Is:

1. A non-GMO metal amino acid chelate composition, comprising a metal amino acid chelate including a naturally occurring amino acid chelated to a metal, said amino acid to metal molar ratio being from about 1:1 to 4:1, wherein both
10 the amino acid and a source of the metal used to form the amino acid chelate are non-GMO.

2. A composition as in claim 1, wherein the naturally occurring amino acid is selected from the group consisting of alanine, arginine, asparagine, aspartic
15 acid, cysteine, cystine, glutamine, glutamic acid, glycine, histidine, hydroxyproline, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and combinations thereof.

3. A composition as in claim 1, wherein the metal is selected from the
20 group consisting of iron, zinc, copper, manganese, calcium, magnesium, chromium, vanadium, selenium, silicon, molybdenum, tin, nickel, boron, cobalt, gold, silver, and combinations thereof.

4. A composition as in claim 1, wherein the metal is a polyvalent metal,
25 and the naturally occurring amino acid to metal molar ratio is from about 1:1 to 3:1.

5. A composition as in claim 1, wherein the metal is ferrous iron and the naturally occurring amino acid is glycine, and wherein the iron to glycine molar

ratio is about 2:1.

6. A composition as in claim 1, wherein the metal is copper and the naturally occurring amino acid is glycine, and wherein the copper to glycine molar ratio is about 2:1.

7. A composition as in claim 1, wherein the metal is zinc and the naturally occurring amino acid is glycine, and wherein the zinc to glycine molar ratio is about 2:1.

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8. A composition as in claim 1, wherein the metal is manganese and the naturally occurring amino acid is glycine, and wherein the manganese to glycine molar ratio is about 2:1.

9. A composition as in claim 1, wherein the metal is ferric iron and the naturally occurring amino acid is glycine, and wherein the ferric iron to glycine molar ratio is about 3:1.

10. A composition as in claim 1, wherein the metal is chromium and the naturally occurring amino acid is glycine, and wherein the iron to glycine molar ratio is about 3:1.

11. A composition as in claim 1, wherein the metal is magnesium and the naturally occurring amino acid is glycine, and wherein the magnesium to glycine molar ratio is about 1:1.

12. A composition as in claim 1, wherein the metal is calcium and the naturally occurring amino acid is glycine, and wherein the calcium to glycine molar ratio is about 1:1.

13. A composition as in claim 1, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by a method other than protein hydrolysis.

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14. A composition as in claim 13, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared synthetically.

15. A composition as in claim 13, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by fermentation.

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16. A composition as in claim 1, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by protein hydrolysis, and wherein the protein used in the hydrolysis is non-GMO.

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17. A non-GMO metal amino acid chelate-containing composition, comprising:

a) a non-GMO metal amino acid chelate including a naturally occurring amino acid chelated to a metal, said amino acid to metal molar ratio being from about 1:1 to 4:1, wherein both the amino acid and a source of the metal used to form the amino acid chelate are non-GMO; and

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b) a non-GMO formulation additive, with the proviso that all components of the non-GMO metal amino acid chelate-containing composition are non-GMO.

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18. A composition as in claim 17, wherein the formulation additive is a non-GMO organic acid.

19. A composition as in claim 18, wherein the non-GMO organic acid is

selected from the group consisting of citric acid, fumaric acid, succinic acid, tartaric acid, malic acid, lactic acid, gluconic acid, ascorbic acid, pantothenic acid, folic acid, lipoic acid, oxalic acid, maleic acid, formic acid, acetic acid, pyruvic acid, adipic acid, alpha-ketoglutaric acid, and mixtures thereof.

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20. A composition as in claim 17, wherein the formulation additive is a non-GMO filler.

21. A composition as in claim 20, wherein the non-GMO filler is selected
10 from the group consisting of grain flours, maltodextrins, vegetable flours or powders, inulin, and combinations thereof.

22. A composition as in claim 17, wherein the formulation additive is a non-GMO flow control agent.

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23. A composition as in claim 22, wherein the non-GMO flow control agent is selected from the group consisting of fumed silica, stearic acid, talc, and combinations thereof.

20 24. A composition as in claim 17, wherein the formulation additive is selected from the group consisting of free amino acids, amino acid salts, and combinations thereof.

25 25. A composition as in claim 17, wherein the formulation additive is selected from the group consisting of vitamins, coenzymes, cofactors, herbs, herbal extracts, protein powders, and combinations thereof.

26. A composition as in claim 17, wherein the formulation additive is selected from the group consisting of mineral oils, binders, flavoring or taste-

free additives, and combinations thereof.

27. A composition as in claim 17, wherein the naturally occurring amino acid is selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, cystine, glutamine, glutamic acid, glycine, histidine, hydroxyproline, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and combinations thereof.

28. A composition as in claim 17, wherein the metal is selected from the group consisting of iron, zinc, copper, manganese, calcium, chromium, vanadium, selenium, silicon, molybdenum, tin, nickel, boron, cobalt, gold, silver, and combinations thereof.

29. A composition as in claim 17, wherein the metal is a polyvalent metal, and the naturally occurring amino acid to metal molar ratio is from about 1:1 to 3:1.

30. A composition as in claim 17, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by a method other than protein hydrolysis.

31. A composition as in claim 30, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared synthetically.

32. A composition as in claim 30, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by fermentation.

33. A composition as in claim 17, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by protein hydrolysis,

and wherein the protein used in the hydrolysis is non-GMO.

34. A method of preparing a non-GMO metal amino acid chelate, comprising:

- 5 a) selecting an amino acid source determined to be non-GMO;
 b) selecting a metal source determined to be non-GMO; and
 c) chelating an amino acid of the amino acid source to a metal of the metal source, thereby forming a non-GMO metal amino acid chelate.

10 35. A method as in claim 34, wherein during the step of selecting the amino acid source, if a first amino acid source is a GMO, additional amino acid sources are evaluated until a non-GMO amino acid source is ascertained.

15 36. A method as in claim 34, wherein during the step of selecting the metal source, if a first metal source is a GMO, additional metal sources are evaluated until a non-GMO metal source is ascertained.

20 37. A method as in claim 34, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by a method other than protein hydrolysis.

38. A method as in claim 37, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared synthetically.

25 39. A composition as in claim 37, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by fermentation.

40. A method as in claim 34, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by protein hydrolysis, and

wherein the protein used in the hydrolysis is non-GMO.

41. A method as in claim 34, further comprising selecting an additive determined to be non-GMO, and including the additive as a mixture with the non-GMO metal amino acid chelate.

42. A method as in claim 41, wherein the additive is selected from the group consisting of non-GMO organic acids, non-GMO free amino acids, non-GMO amino acid salts, non-GMO fillers, non-GMO flow control agents, non-GMO lubricants, non-GMO flow agents, non-GMO hydroscopicity minimizing agents, non-GMO pH control agents, non-GMO catalysts, non-GMO vitamins, non-GMO dust control agents, non-GMO binders, non-GMO disintegrating agents, non-GMO flavoring agents, non-GMO taste-reducing agents, non-GMO capsule shells, non-GMO shellacs, non-GMO waxes, non-GMO emulsifiers, non-GMO oils, and combinations thereof.

43. A method of administering a metal amino acid chelate, comprising:
a) formulating a non-GMO metal amino acid chelate by:
i) selecting an amino acid source determined to be non-GMO,
ii) selecting a metal source determined to be non-GMO, and
iii) chelating an amino acid of the amino acid source to a metal of the metal source, thereby forming the non-GMO metal amino acid chelate; and
b) administering the non-GMO metal amino acid chelate to the subject.

44. A method as in claim 43, wherein during the step of selecting the amino acid source, if a first amino acid source is a GMO, additional amino acid sources are evaluated until a non-GMO amino acid source is ascertained.

45. A method as in claim 43, wherein during the step of selecting the metal source, if a first metal source is a GMO, additional metal sources are evaluated until a non-GMO metal source is ascertained.

5 46. A method as in claim 43, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by a method other than protein hydrolysis.

10 47. A method as in claim 46, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared synthetically.

48. A composition as in claim 46, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by fermentation.

15 49. A method as in claim 43, wherein the naturally occurring amino acid used to prepare the amino acid chelates is prepared by protein hydrolysis, and wherein the protein used in the hydrolysis is non-GMO.

20 50. A method as in claim 43, further comprising selecting an additive determined to be non-GMO, and including the additive as a mixture with the non-GMO metal amino acid chelate.

25 51. A method as in claim 50, wherein the additive is selected from the group consisting of non-GMO organic acids, non-GMO free amino acids, non-GMO amino acid salts, non-GMO fillers, non-GMO flow control agents, non-GMO lubricants, non-GMO flow agents, non-GMO hydroscopicity minimizing agents, non-GMO pH control agents, non-GMO catalysts, non-GMO vitamins, non-GMO dust control agents, non-GMO binders, non-GMO disintegrating agents, non-GMO flavoring agents, non-GMO taste-reducing agents, non-GMO capsule

shells, non-GMO shellacs, non-GMO waxes, non-GMO emulsifiers, non-GMO oils, and combinations thereof.

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